

PJM Generation Interconnection Request

Queue X1-028

Upton 34.5kV

Feasibility Study

66994v1
October 2011

Preface

The intent of the feasibility study is to determine a plan, with ballpark cost and construction time estimates, to connect the subject generation interconnection project to the PJM network at a location specified by the Interconnection Customer. As a requirement for interconnection, the Interconnection Customer may be responsible for the cost of constructing: Network Upgrades, which are facility additions, or upgrades to existing facilities, that are needed to maintain the reliability of the PJM system. All facilities required for interconnection of a generation interconnection project must be designed to meet the technical specifications (on PJM web site) for the appropriate transmission owner.

In some instances an interconnection customer may not be responsible for 100% of the identified network upgrade cost because other transmission network uses, e.g. another generation interconnection or merchant transmission upgrade, may also contribute to the need for the same network reinforcement. The possibility of sharing the reinforcement costs with other projects may be identified in the feasibility study, but the actual allocation will be deferred until the impact study is performed.

The Feasibility Study estimates do not include the feasibility, cost, or time required to obtain property rights and permits for construction of the required facilities. The project developer is responsible for the right of way, real estate, and construction permit issues. For properties currently owned by Transmission Owners, the costs may be included in the study.

General

The Interconnection Customer is proposing a 20MW (7.6MW Capacity) solar pv generation project to be interconnected to the Allegheny Power (APS) transmission system and located approximately 1.5 miles from the Upton substation. APS is a FirstEnergy (FE) company. The proposed in-service date for this project is November 30, 2012.

This Generation Interconnection Feasibility Study provides analysis results to aid the Interconnection Customer in assessing the practicality and cost of incorporating the facility into the PJM system.

Facilities to Accommodate the Interconnection

Scope of Direct Connection Work

To accommodate this interconnection, a new 34.5kV bus with three new 34.5kV bays and three new 34.5kV breakers must be installed at the Upton substation, along with yard expansion, metering and SCADA. Also the Mercersburg – Milnor 34.5kV line must be looped into the station (See Figure 1 below). It is estimated to take 18 months after the receipt of an executed Interconnection Service Agreement and Construction Service Agreement to complete this work.

The Interconnection Customer is responsible for constructing all of the facilities on the Interconnection Customer's side of the Point of Interconnection.

Direct Connection Cost Estimate

The total preliminary cost estimate for Direct Connection work performed by APS is **\$2,020,367**. This estimate consists of:

Description	Total Cost
Upton Substation: Expand fence and yard. Add new 34.5kV bus with three new 34.5kV bays and three new 34.5kV breakers. Loop Mercersburg – Milnor 34.5kV line into the station. Add metering and SCADA.	\$2,020,367
Total Cost:	\$2,020,367

Non-Direct Connection Cost Estimate

The total preliminary cost estimate for Non-Direct Connection work performed by APS is **\$254,278**. This estimate consists of:

Description	Total Cost
Install anti-islanding (transfer trip) facilities at the remote breakers.	\$254,278
Total Cost:	\$254,278

Revenue Metering and SCADA Requirements

For PJM: The Interconnection Customer will install equipment necessary to provide Revenue Metering (KWH, KVARH) and real time data (KW, KVAR) for Interconnection Customer's generating Resource. See PJM Manuals M-01 and M-14D, and PJM Tariff Section 24.1 to 24.2.

For APS: See AP Revenue Metering Requirements for Generation Interconnection Customers and Allegheny Power Engineering Manual Section 19, Subject Index 36.0.

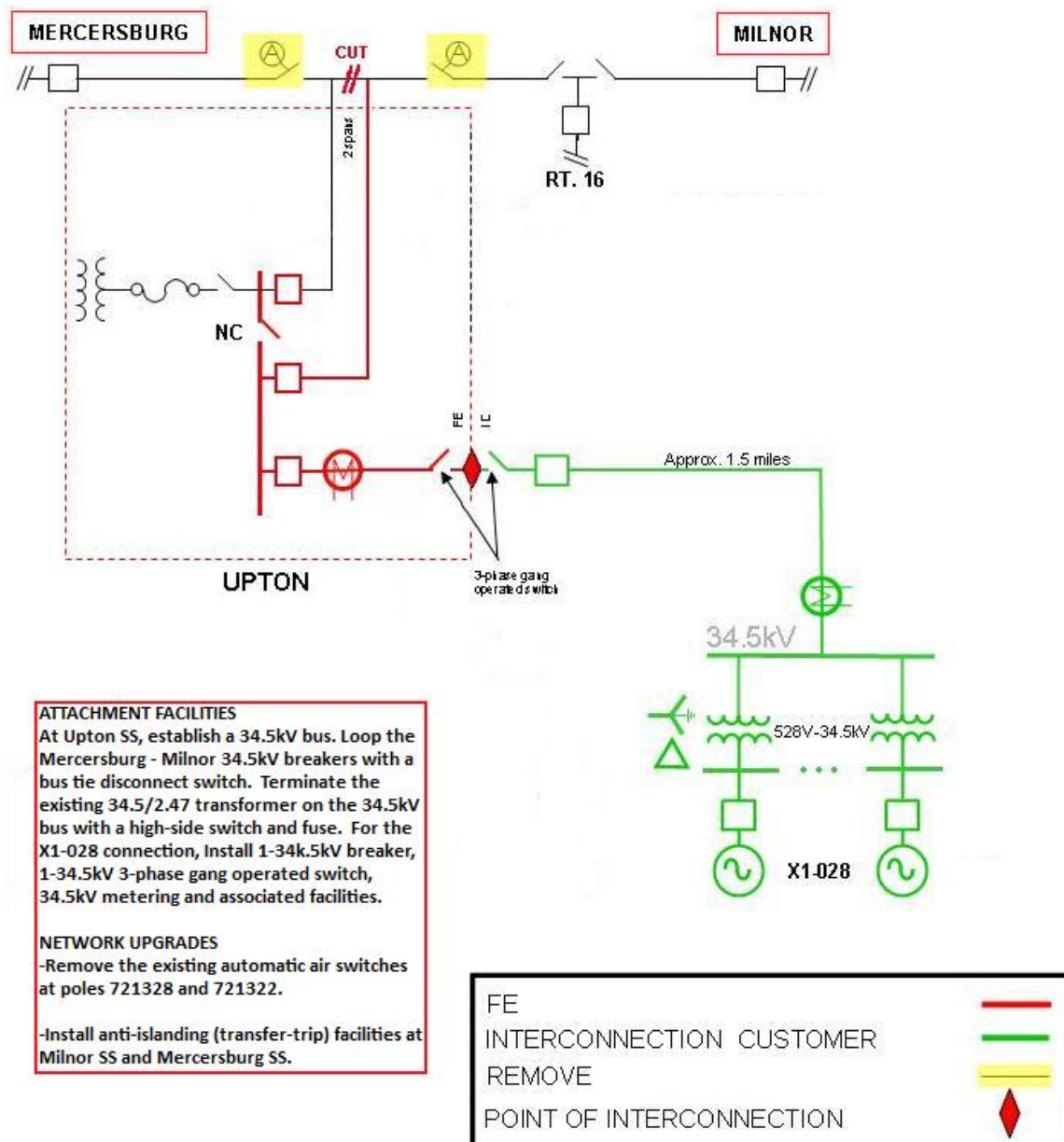


Figure 1. One Line Diagram

Network Impacts

The X1-028 project was studied as a 20MW (7.6MW Capacity) injection into the APS area at the UPTON 34.5kV substation. Project X1-028 was evaluated for compliance with reliability criteria for summer peak conditions in 2015.

Since the analysis for this report was completed, some prior queue projects have withdrawn, which may change some of the results that are shown below. More up to date results will be provided in the System Impact Study report.

Potential network impacts were as follows:

Generator Deliverability

(Single or N-1 contingencies for the Capacity portion only of the interconnection)

The Milnor to Route 16 34.5kV line loads from 99.2% to 128.3% of its emergency rating (36.8 MVA) for the single contingency loss of V3-062 Tap – Texas Eastern 6 138kV line. This project contributes approximately 10.36MW to the thermal violation. This is an overload found by APS. Since this analysis was done, some prior queue projects have withdrawn from the PJM queue. This overload will be reviewed during the System Impact Study to check its validity.

Multiple Facility Contingency

(Double Circuit Tower Line contingencies were studied for the full energy output. The contingencies of Line with Failed Breaker and Bus Fault will be performed for the Impact Study.)

No violations were identified.

Short Circuit

(Summary of impacted circuit breakers)

Not required.

Contribution to Previously Identified Overloads

(X1-028 contributes to the following contingency overloads, i.e. "Network Impacts", identified for earlier generation or transmission interconnection projects in the PJM Queue)

No violations were identified.

New System Reinforcements

(Upgrades required to mitigate reliability criteria violations, I.e. "Network Impacts", initially caused by the addition of this project's generation.)

The overload of the Milnor to Route 16 34.5kV line can be relieved by reconductoring 4.09 miles of the Milnor to Route 16 34.5kV line and upgrading terminal facilities as necessary. The estimated cost to correct this overload is **\$1,198,297**.

Contribution to Previously Identified System Reinforcements

(Overloads initially caused by prior Queue positions with additional contributions to overloading by this project. This project may have a % allocation cost responsibility which will be calculated and reported for the Impact Study.)

Not required.

Delivery of Energy Portion of Interconnection Request

PJM also studied the delivery of the energy portion of this interconnection request. Any problems identified below are likely to result in operational restrictions to the project under study. The developer can proceed with network upgrades to eliminate the operational restriction at their discretion by submitting a Merchant Transmission Interconnection request.

Note: Only the most severely overloaded conditions are listed below. There is no guarantee of full delivery of energy for this project by fixing only the conditions listed in this section. With a Transmission Interconnection Request, a subsequent analysis will be performed which shall study all overload conditions associated with the overloaded element(s) identified.

(AP/PENELEC) The Greene-Roxbury 138 kV line (from bus 235188 to bus 200532 ckt 1) loads from 98.94% to 100.12% (DC power flow) of its emergency rating (189 MVA) for the operational contingency 'PP1EB'. This project contributes approximately 2.23 MW to the thermal violation.

CONTINGENCY 'PP1EB' / NO PATH
OPEN BRANCH FROM BUS 200101 TO BUS 235632 CKT 1 / 200003 BRIGHTON 500 200004
CNASTONE 500 1
END